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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/757,217	01/14/2004	Robbert van Vossen	57.0554 US NP	3795

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Intellectual Property Law Department
Schlumberger-Doll Research
36 Old Quarry Rd.
Ridgefield, CT 06877

EXAMINER

HUGHES, SCOTT A

ART UNIT	PAPER NUMBER
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3663

DATE MAILED: 06/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/757,217

Applicant(s)

VOSSEN ET AL.

Examiner

Scott A. Hughes

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 13-16 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. ____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 8 and 11 are rejected under 35 USC 112 2nd paragraph.

Claim 8 recites the limitation "the whole seismogram." There is insufficient antecedent basis for this limitation in the claim because a seismogram is not defined or mentioned in claim 1, from which claim 8 depends. For the purpose of this action, it is assumed that "the seismogram" is meant to be the "seismic wavefield" recited in claim 1.

Claim 11 recites the limitation "the free-surface plane wave." There is insufficient antecedent basis for this limitation in the claim because claim 1, from which claim 11 depends, does not make reference to a "free-surface plane wave."

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3-8, 10, 14, and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Trampert.

With regard to claim 1, Trampert discloses a method for retrieving local near-surface material information (Summary). Trampert discloses providing a group of receivers comprising at least one buried receiver and at least one surface receiver (Summary, page 296, 2nd Column; Figs. 1-2). Trampert discloses recording a seismic wavefield, estimating a propagator from the recorded seismic wavefield, inverting the propagator and retrieving the near-surface material information (Pages 293-295).

With regard to claim 3, Trampert discloses that the receivers are geophones (Fig. 1; Page 299, 1st column).

With regard to claim 4, Trampert discloses that the buried receiver is a three-component geophone (Fig. 1).

With regard to claim 5, Trampert discloses that the buried receiver is located at a depth of less than 10 meters.

With regard to claim 6, Trampert discloses that the buried receiver is located in a borehole (Summary; Fig. 1).

With regard to claim 7, Trampert discloses that the seismic wavefield comprises P and S waves (Page 293, 2nd column).

With regard to claim 8, Trampert discloses that the propagator is calculated for the whole seismogram (Page 293-295).

With regard to claim 10, Trampert discloses assuming that the recorded seismic wavefield can be written as a superposition of plane waves (Page 293, 1st column, under "Propagator Inversion").

With regard to claim 14, Trampert discloses that the inversion for material properties is carried out for the surface wave component of the seismic signal (Page 294, 2nd column).

With regard to claim 16, Trampert discloses a method for retrieving local near-surface material information (Summary, page 293). Trampert discloses obtaining seismic wavefield information from a group of receivers comprising at least one buried receiver and at least one surface receiver (Summary, page 296, 2nd Column; Figs. 1-2). Trampert discloses estimating a propagator from the recorded seismic wavefield. Trampert discloses inverting the propagator and retrieving the near-surface material information (Pages 293-295).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Trampert in view of Frasier or Bakulin.

With regard to claim 2, Trampert discloses that the group of receivers comprises one surface receiver and not a plurality of them. It is known in the art to use more than one receiver at spaced apart locations on the surface in order to obtain data about a larger area (see Frasier, Bakulin).

Claims 9 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Trampert in view of Ivansson or Aki.

With regard to claim 9, Trampert discloses that the propagator is a P-SH propagator, not a P-SV propagator. Trampert recognizes that two different decompositions are SH and coupled P-SV waves, but states that the propagator of his disclosure is for the P-SH form (Page 293, 2nd Column). It is known in the art that a propagator matrix for the wave can be a coupled P-SV propagator also. Ivansson discloses the use of P-SV propagator matrices for use in determining the properties of layers. Aki discloses propagator matrices for both SH and P-SV problems. It would have been obvious to modify Trampert to use a coupled P-SV propagator as disclosed by Aki in order to work with the converted SV components of the wave acquired by the detectors.

With regard to claim 13, Aki discloses that the inversion of the P-SV wave propagator for material properties is carried out in the frequency domain (page 397, bottom to 398).

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Trampert in view of Xu.

With regard to claim 15, Trampert does not disclose that the propagator used is for an anisotropic or a transversely isotropic medium. Trampert discloses propagators for use in homogeneous layer. Xu discloses that most layers of the earth are

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homogeneous, generally anisotropic layers (Page 454, 1st column). Therefore, the propagator of Trampert is for anisotropic media.

Allowable Subject Matter

Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

With regard to claim 12, the closest prior art that disclosed propagator matrices for use with seismic waves did not disclose that the propagator is obtained by calculating the inverse Fourier transform of the coefficients disclosed by the applicant.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Rumpker, who discloses a propagator seismogram for weakly anisotropic media.

Xie, who discloses migration of multicomponent seismic data represented as a superposition of plane waves using a screen propagator.

Beaty, who discloses P-S propagator and inversion.

Causse, who discloses seismic processing using P-SV conversions.

Bloomquist, who discloses a method of processing converted mode seismic data.

Curtis, who discloses a method for estimating seismic material properties.

Leaney, who discloses a method for anisotropic plane wave decomposition using inverse Fourier transforms.

Robertsson, who discloses processing marine data in a low-velocity layer.

Kimball, who discloses sonic well logging using a reduced propagator matrix.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott A. Hughes whose telephone number is 571-272-6983. The examiner can normally be reached on M-F 9:00am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Tarcza can be reached on (571) 272-6979. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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